NATIONAL BUREAU OF STANDARDS REPORT

8698

THE EFFECT OF SURFACE REACTIONS ON FATIGUE FAILURE

Quarterly Status Report
March 1 to May 31, 1965

By

T. R. Shives
and
J. A. Bennett

To

National Aeronautics and Space Administration
Order No. R-14, Amendment No. 4

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

THE NATIONAL BUREAU OF STANDARDS

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* NBS Group, Joint Institute for Laboratory Astrophysics at the University of Colorado.
** Located at Boulder, Colorado.

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This project was authorized for the period September 1, 1964 to August 31, 1965 by National Aeronautics and Space Administration Purchase Order No. R-14, Amendment No. 4. The most recent project status report was submitted to the National Aeronautics and Space Administration in NBS Report 8649 dated March 17, 1965.

During this reporting period equipment for conducting fatigue tests in very dry atmospheres and in inert atmospheres has been completed. This includes a gas purification system and the use of a more efficient environmental chamber around the specimen. An electrolytic hygrometer capable of measuring very small amounts of moisture in gases has been purchased and is in use.

Fatigue tests on specimens of Ti-4Al-4Mn in an inert atmosphere have begun. Results of tests conducted thus far indicate that moisture has a deleterious effect on the fatigue life of this titanium alloy even in the absence of oxygen. It is not yet possible to conclude whether there is any significant difference in the fatigue life of specimens tested in a moist, oxygen-free atmosphere and those tested in a moist atmosphere containing oxygen. Neither can it be said with any certainty whether there is any difference in fatigue life between specimens tested in a dry, oxygen-free atmosphere and those tested in a dry atmosphere containing oxygen.

Specimens of vacuum melted 4340 steel have been produced. Tests on these specimens and further tests on the titanium alloy specimens will be conducted during the next reporting period.

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